CENTER FOR NANOHYBRID FUNCTIONAL MATERIALS

MONDAY
OCTOBER 13, 2014
2:30 – 4:00 PM
W347 NEBR. HALL - UNL

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Utilizing Microfluidic and Nanofluidic Devices for Genome Analysis and Sensing of Virus Particles

The utilization of microfluidic and nanofluidic devices is altering the pace and scope of virus sensing, genome analysis, etc. In this regard, Nanocoding System was developed as a single molecule platform for construction of physical maps that span entire genomes. This platform elongates DNA molecules in nanoslits and effectively discovers genomic structural alterations including insertions, deletions, etc. In this device, we leverage entropic differences between the microchannel and nanoslit dimensions and electrostatic repulsion, from decreasing the overall ionic strength. By doing so, we can elongate DNA molecules to 1.06 (fully stretched DNA molecules = 1).

In a different application, we use microfluidic devices to build a biosensor device. First, we pattern glass coverslips by flowing poly(diallyldimethylammonium) chloride into polydimethylsiloxane (PDMS) microchannels, which are affixed to a glass coverslip. After the surface is dry, we remove the PDMS device and attach gold nanoparticles to the surface by incubating in a solution of spherical gold nanoparticles. Finally, we coat the gold nanoparticles with Protein A.

Seminar hosted by Dr. Mathias Schubert, UNL Department of Electrical Engineering

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